May 1, 1923. 1,453,398

G. M. LITTLE

SELF TIGHTENING WATER COOLED TERMINAL

Filed April 21, 1921

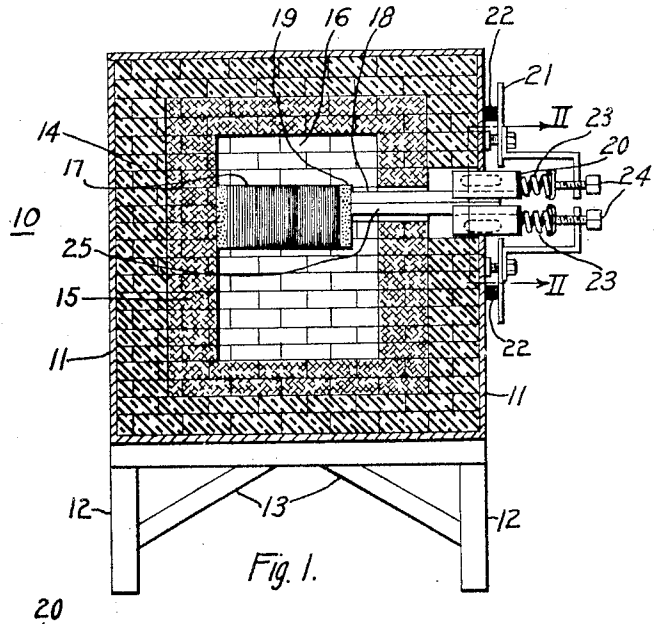

Fig. 1.

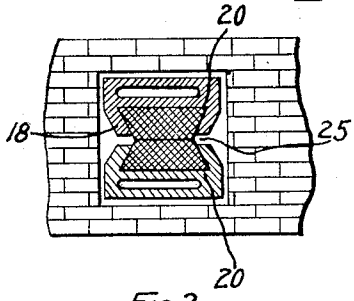

Fig. 2

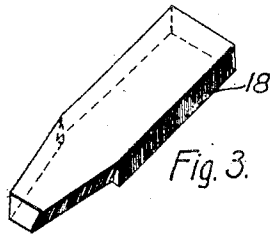

Fig. 3.

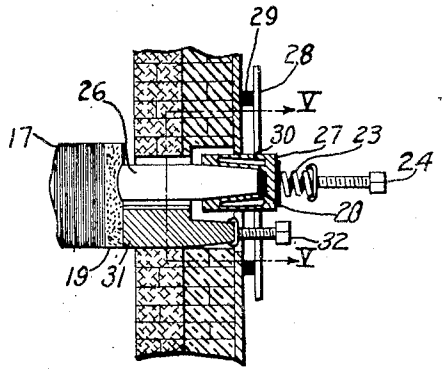

Fig. 4.

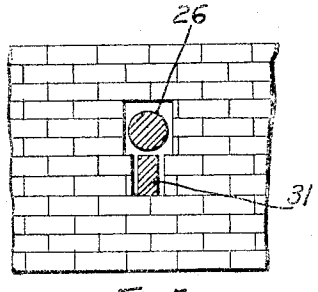

Fig 5

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Patented May 1, 1923.

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UNITED STATES PATENT OFFICE.

GEORGE M. LITTLE, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

SELF-TIGHTENING WATER-COOLED TERMINAL.

Application filed April 21, 1921. Serial No. 463,221.

To all whom it may concern:

Be it known that I, GEORGE M. LITTLE, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Self-Tightening Water-Cooled Terminals, of which the following is a specification.

My invention relates to electric furnaces and particularly to electric-resistance furnaces and it has for its object to provide a new and improved water-cooled contact terminal for the electrodes of resistance furnaces.

In high-temperature furnaces of the type disclosed in my application, Serial No. 454,776, filed March 23, 1921 is disclosed an electric heating means comprising a plurality of carbonaceous elements having surface engagement with each other and maintained in proper operative relation in the furnace chamber by means of resiliently mounted carbonaceous electrodes. In case of failure of one of these electrodes, it is highly desirable to provide means for maintaining said heating means in its operative position in said furnace while such electrode is removed and replaced by another.

In practicing my invention, I provide a carbonaceous electrode with a wedging metallic water-cooled contact terminal engaging its outer end and I provide an auxiliary means for maintaining the resilient compression of the subdivided heating means independent of the resiliently compressd electrode and contact terminal.

In the single sheet of drawings,

Figure 1 is a view, in vertical cross-section, of an electric-resistance furnace comprising the device embodying my invention;

Fig. 2 is a view, in vertical section, on the line II—II of Fig. 1;

Fig. 3 is a view, in perspective, of an electrode employed in the furnace illustrated in Fig. 1;

Fig. 4 is a view, in vertical section, of a portion of the furnace illustrated in Fig. 1 and comprising a modification of the device embodying my invention; and

Fig. 5 is a view, in vertical section, on the line V—V of Fig. 4.

An electric-resistance furnace 10 comprises an outer metallic casing or framework 11 provided with suitable supporting members 12 and corner braces 13. A lining 14 of a suitable heat-insulating material comprises a plurality of refractory bricks or blocks located inside of casing 11. An inner lining 15 comprises a plurality of refractory high temperature-resisting refractory bricks or blocks located inside of the lining 14 and suitably spaced apart to provide a furnace chamber 16. A resistor 17 located in the furnace chamber 16, comprises a plurality of engaging elements resiliently maintained in close operative engagement, substantially as described in the hereinbefore mentioned application. A carbonaceous electrode 18, which is substantially rectangular in cross-section, has its inner end engaging a graphite-plate member 19 that is interposed between the electrode 18 and the resistor 17. The outer end of the electrode 18 is trapezoidal in cross-section and has inclined edges that converge outwardly.

A metallic water-cooled contact terminal 20 is mounted on the outer end of the electrode 18 and is of such form as to engage its upper and side faces with a wedging fit.

Resilient compressing means are provided for the electrode 18 and the contact terminal 20, and comprise a metallic framework 21 suitably secured to the casing 11, but insulated therefrom by a member 22, a spring 23 and an adjusting screw 24 adapted to press the spring 23 against the outer end of the terminal 20. Suitable means (not shown) are provided for connecting the supply circuit to the contact terminal 20. Suitable means (not shown), comprising water-supply pipes, are connected to the contact terminal 20 to water-cool the same.

Auxiliary means for maintaining the resistor 17 and the graphite block 19 in proper operative relation in the furnace chamber 16 comprise an auxiliary electrode 25 and a second contact terminal 20, the electrode 25 being substantially of the same shape and cross-section as the electrode 18. Resilient compressing means, comprising a helical spring 23 and an adjusting screw 24, press the contact terminal 20 against the electrode 25 and the electrode 25 against the terminal block 19. The auxiliary electrode and contact terminal may be used during the normal operation of the furnace, if desired, suitable

electric-supply-circuit connections being made as hereinbefore described for the main electrode and contact terminal.

In the modification illustrated in Fig. 4, an electrode 26 comprises a rod of carbonaceous material, substantially circular in cross-section and having a tapered outer end. A metallic water-cooled contact terminal 27 is provided which may be substantially circular in cross-section and be provided with a tapered recess 28 into which the tapered end of the electrode 26 is adapted to fit. Resilient compressing means are provided, substantially as described in connection with the furnace illustrated in Fig. 1, comprising a helical spring 23 and a suitably mounted adjusting screw 24.

The mounting means for the compressing means may comprise a plate 28 which is secured against the metallic casing 11, an annular insulating member 29 being placed therebetween. An opening 30 is provided in the plate 28 of such size and dimensions as to fit closely around the contact terminal 27.

An auxiliary electrode 31 is located immediately below the electrode 26 and is engaged by an adjusting screw 32 to press it against the graphite block 19 to maintain the resistor 17 in proper operative position in the furnace chamber in case of a fracture of the main electrode 26.

It may be noted that, in case of a defective main electrode, necessitating the removal thereof and the insertion of a new electrode, the auxiliary electrode 25 or 31 may be caused to operatively engage the graphite block 19 with a force sufficient to maintain the heating element in proper operative position in the furnace chamber in order that the main electrode may be withdrawn and a new electrode inserted.

It may also be noted that I provide a relatively simple wedging contact terminal for the main electrode of the electric furnace which permits of ready attachment and removal.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof and I desire that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

I claim as my invention:

1. In an electric-resistance furnace, the combination with a resistor and an electrode operatively engaging said resistor, of a quickly detachable wedging contact terminal operatively engaging said electrode and resilient means for maintaining said resistor, electrode and contact terminal in respective operative engagement.

2. In an electric furnace, the combination with a resistor comprising a plurality of refractory elements, a terminal electrode operatively engaging said resistor, a wedging contact terminal mounted on the end of said electrode and resilient means for pressing said terminal, electrode, and resistor into close operative engagement, of auxiliary means for maintaining said resistor elements in operative position independent of said electrode, contact terminal and resilient means.

3. In an electric furnace, the combination with a refractory resistor and a refractory electrode operatively engaging said resistor and maintaining it in operative position in said furnace, of an auxiliary electrode for maintaining said resistor in its operative position independent of said first electrode.

In testimony whereof, I have hereunto subscribed my name this 11th day of April 1921.

GEORGE M. LITTLE.